
**Ships and marine technology —
Fire-extinguishing systems for
protection of galley cooking
equipment**

*Navires et technologie maritime — Systèmes d'extinction d'incendie
des équipements de cuisine*

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ISO 15371:2009

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15371 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 1, *Lifesaving and fire protection*.

This second edition cancels and replaces the first edition (ISO 15371:2000). Clause 5 has been technically revised along with minor editorial corrections throughout this International Standard.

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Introduction

While this International Standard provides the marine industry with a means for evaluating the effectiveness of fire-extinguishing systems for a variety of grease-laden cooking appliances that may be found in a galley, it is also referenced by the International Maritime Organization (IMO) International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, and provides organizations who are party to SOLAS with a means of ensuring conformance of deep-fat cooking equipment with the fire suppression requirements prescribed in SOLAS.

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Ships and marine technology — Fire-extinguishing systems for protection of galley cooking equipment

1 Scope

This International Standard applies to the design, testing, and operation of pre-engineered fire extinguishing systems to protect the galley hoods, ducts, fryers and other grease-laden appliances.

Pre-engineered fire-extinguishing system units are also required to comply with requirements for the construction and components performance as applicable to specific types, designs, sizes and arrangements. This International Standard also provides minimum requirements for the testing and evaluation of components.

A product that contains features, characteristics, components, materials or systems that are new or different from those covered by the requirements in this International Standard and that involve a risk of fire, electric shock, or injury to persons, shall be evaluated using the appropriate additional component and end-product testing.

NOTE Only deep-fat cooking equipment, among the types of galley cooking equipment covered by this International Standard, are required by SOLAS chapter II-2 Regulation 10.6.4 to have fixed fire-extinguishing systems.

2 Terms and definitions

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For the purposes of this document, the following terms and definitions apply.

2.1

auxiliary equipment

equipment used in conjunction with the extinguishing system

EXAMPLE Auxiliary equipment can be used to shut down power, fuel or ventilation to the hazard area being protected or to initiate alarm or signalling devices.

2.2

cooking appliance

cooking device that has, or is capable of having, a surface of liquid grease or one in which cooking with grease is involved

EXAMPLE Deep fat fryer, griddle, range, chain-broiler, electric char-broiler, charcoal broiler, mesquite broiler, gas radiant char broiler, wok, tilt skillet/braising pan and similar appliances.

NOTE The protected area is limited to the cooking area of the appliance only.

2.3

cooking grease

grease

vegetable shortening incorporating an antifoaming agent

2.4
cylinder/valve assembly
container that incorporates a valve and that provides storage for the extinguishing agent and expellant gas until the valve is actuated

NOTE For cartridge-operated units, this assembly includes the extinguishing-agent storage container and cartridge mechanism.

2.5
deep fat fryer
commercially available electric cooking appliance in which cooking greases in depth are used

2.6
discharge nozzle
device that is used to distribute the extinguishing agent over or into a specific area

2.7
discharge rate
ratio of the quantity of the extinguishing agent discharged from a nozzle to the discharge time measured to within ± 1 s, expressed in kg/s

2.8
discharge time
time interval between the first appearance of the extinguishing agent at the nozzle and the time at which the discharge becomes predominantly gaseous or ceases

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2.9
duct
duct system
continuous enclosed passageway for the transmission of air and cooking vapours

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2.10
expellent gas
nitrogen air or other gas used to facilitate the discharge of the extinguishing agent

2.11
extinguishing system unit
identified components that can be assembled into a system for the discharge of an extinguishing agent through fixed piping and nozzles for the purpose of extinguishing fires

2.12
gas cartridge
container that provides storage for an expellant gas only

2.13
grease filter
component of a grease vapour removal system that deflects the air and vapours passing through it in such a manner as to result in the grease vapours concentrating, condensing, or both, for the purpose of grease collection

2.14
hood
device provided as part of an exhaust system to direct and capture grease vapours and exhaust gases from a cooking appliance

2.15
indicator
mechanical or electrical device that shows when an extinguishing system or one of its critical components is ready to operate or has already operated

2.16**inspection**

visual examination of the system or portion thereof to verify that it appears to be in operating condition and is free of physical damage

2.17**low quality fatty beef steak**

beef steak containing 20 % to 30 % fat or gristle, well marbled and uniform in size

2.18**maintenance**

work, including, but not limited to, repair, replacement and service, performed to ensure that the equipment operates properly

2.19**manual means of actuation**

means of system actuation in which a system is discharged by manual means

2.20**manufacturer's installation and maintenance manual**

document containing the design, installation and maintenance instructions which is prepared and approved as a complimentary part of the extinguishing system

2.21**multiple-vat deep fat fryer**

multiple electric fryers that are mechanically joined together

NOTE

Each vat incorporates a separately controlled heating source.

2.22**operable pressure**

pressure developed in a fully charged container conditioned at 21 °C for at least 24 h

2.23**operable pressure range**

pressure range corresponding to the pressures in the storage container at the specified minimum and maximum temperatures for which the extinguishing system is intended to be operable

2.24**operating devices**

mechanical, electrical or pneumatic devices involved in the operation of a system

2.25**operation**

⟨automatic operation⟩ operation without human intervention

NOTE

Methods of automatic operation include, but are not limited to, heat, rate of temperature rise, smoke or pressure change.

2.26**operation**

⟨manual operation⟩ operation of a system or its components through human action

2.27**owner's manual**

pamphlet containing the manufacturer's recommendations for proper inspection and operation, which is prepared and approved as a complimentary part of the extinguishing system

**2.28
plenum**

volume of enclosed space between the grease filters and the portion of the hood above the grease filters in a hood and duct system

**2.29
pre-engineered system**

system that is tested in accordance with the limitations prescribed by the manufacturer for the maximum and minimum pipe lengths, accessories, number of fittings, number and types of nozzles, nozzle placement, types of fire risk and the maximum dimensions, volumes and areas of the appliances, hoods and ducts to be protected

NOTE 1 The hazards protected by these systems are specifically limited as to type and size by testing on actual fires.

NOTE 2 The limitations on hazards that are permitted to be protected by these systems and piping and nozzle configurations are those contained in the manufacturer's installation and maintenance manual.

**2.30
pressure vessel
pressure cylinder**

container that provides storage for the extinguishing agent and expellant gas

**2.31
product**

fire extinguishing system or any part thereof covered by the requirements of this International Standard

**2.32
shut-off device**

device that operates simultaneously with the extinguishing system to shut off fuel and power to the appliances protected by the system and other appliances required to be shut off upon operation of the system

**2.33
signal**

status indication communicated by electrical or other means

**2.34
split-vat deep fat fryer**

electric fryer that incorporates a divided partition which splits the fryer in sections

NOTE Each split-vat fryer incorporates a separately controlled heating source.

**2.35
tilt skillets/braising pans**

cooking devices which are intended to braise, simmer, sauté, or fry foods

3 Components

3.1 General

Only system components referenced or permitted in the manufacturer's installation and maintenance manual or alternative components that have been approved for use with the specific extinguishing system shall be used.

3.2 Detectors

Detectors shall be approved devices that are capable of detecting fire.

3.3 Discharge nozzles

- 3.3.1** Discharge nozzles shall be approved for their intended use.
- 3.3.2** Nozzles shall be provided with an internal strainer or a separate approved strainer located immediately up-stream of the nozzle.
- 3.3.3** Nozzles shall be constructed of brass, stainless-steel, or other corrosion-resistant materials, or be protected inside and out against corrosion.
- 3.3.4** Nozzles shall be made of non-combustible materials and shall withstand the expected fire exposure without deformation.
- 3.3.5** Nozzles shall be permanently marked for identification.
- 3.3.6** All discharge nozzles shall be provided with caps or other suitable devices to prevent the entrance of grease vapours, moisture, or other foreign materials into the piping.
- 3.3.7** The caps or other protection devices shall blow off, open or blow out upon agent discharge.

3.4 Operating devices

3.4.1 Operating devices shall be designed for the service they will encounter and shall not be rendered inoperative by, or be susceptible to, accidental operation.

3.4.2 Operating devices shall be designed to function properly through a temperature range from 0 °C to 49 °C, or marked to indicate the temperature limitations.

3.5 Manual actuators

- 3.5.1** Manual actuators shall not require a force of more than 178 N.
- 3.5.2** Manual actuators shall not require a movement of more than 356 mm to secure operation.
- 3.5.3** All manual actuators shall be provided with operating instructions. These instructions may include the use of pictographs, and shall have lettering at least 6 mm in height.
- 3.5.4** All remote manual operating devices shall be marked to identify the hazard against which they protect.

3.6 Shut-off devices

- 3.6.1** On activation of any cooking equipment or hood/duct fire extinguishing system, all sources of fuel and electric power that produce heat to all equipment protected by the system shall be shut off automatically.
- 3.6.2** Gas appliances not requiring protection but located under the same ventilation equipment shall also be shut off.
- 3.6.3** Exhaust fans and dampers are not required to be shut off on system actuation if the fire-extinguishing system has been tested under both zero and high-velocity flow conditions.
- 3.6.4** If the expellant gas is used to pneumatically operate the shut-off devices, the gas shall be sourced prior to its entry into the agent storage cylinder.
- 3.6.5** Shut-off devices shall require manual resetting prior to fuel or power being restored.

3.7 Pipe, fittings, tubing and hose

3.7.1 Pipe and associated fittings shall be of non-combustible material having physical and chemical characteristics compatible with the extinguishing agent.

3.7.2 The pressure rating of the pipe, fittings and connection joints shall withstand the maximum expected pressure in the piping system.

3.7.3 Pipe, tubing, hose and fitting materials and types shall be in accordance with the manufacturer's installation and maintenance manual.

3.8 Extinguishing agent

3.8.1 The agent used shall be identified for the particular system in the operation and maintenance manual as recommended by the manufacturer of the system.

3.8.2 Agents from different manufacturers shall not be mixed.

3.9 Indicators

3.9.1 Systems shall be provided with an audible or visual indicator to show that the system is in a ready condition or is in need of recharging.

4 System requirements **STANDARD PREVIEW**

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4.1 General

4.1.1 Fire-extinguishing systems shall meet the requirements of 5.4.

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4.2 Use

4.2.1 Equipment that can be protected against hazard includes:

- a) cooking hoods, plenums, ducts, and filters with their associated cooking appliances, including deep fat fryers, ranges, broilers, griddles and similar grease-laden appliances;
- b) special grease removal devices;
- c) energy recovery devices installed in the exhaust system.

4.3 Applications

4.3.1 The manufacturer's installation and maintenance manual shall be consulted for the system's limitations and applications for which the approved system is considered satisfactory protection.

4.3.2 Each protected cooking appliance, individual hood and branch exhaust duct directly connected to the hood, shall be protected by a system or systems designed for simultaneous operation.

4.3.3 Where two or more hazards can be simultaneously involved in fire by reason of their proximity, the hazards shall be protected by either of the following:

- a) individual systems installed to operate simultaneously;
- b) a single system designed to protect all hazards that can be simultaneously involved.